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| Metal.          | Chemical equivalent. | Refraction-equivalent. | Specific refractive energy. |
|-----------------|----------------------|------------------------|-----------------------------|
| Potassium ..... | 39                   | 8·0                    | 0·205                       |
| Sodium .....    | 23                   | 4·6                    | 0·200                       |
| Lithium.....    | 7                    | 3·9                    | 0·557                       |
| Magnesium ..... | 12                   | 3·7                    | 0·308                       |
| Barium .....    | 68·5                 | 7·8                    | 0·114                       |
| Strontium ..... | 43·8                 | 6·5                    | 0·148                       |
| Calcium.....    | 20                   | 5·2                    | 0·260                       |
| Zinc .....      | 32·6                 | 4·8                    | 0·147                       |
| Nickel .....    | 29·5                 | 5·1                    | 0·173                       |
| Cobalt .....    | 29·4                 | 5·2                    | 0·177                       |
| Lead .....      | 103·5                | 12·1                   | 0·117                       |
| Mercury .....   | 100                  | 9·8                    | 0·098                       |
| Ammonium .....  | 18                   | 11·4                   | 0·633                       |

These numbers are suggestive in many ways; but I will only remark the very high refractive energy of lithium, the practical identity of nickel and cobalt, and the remarkable fact that the specific refractive energy of the metals are (with one or two exceptions) in the inverse order of their atomic weights.

IV. "A Third Memoir on Skew Surfaces, otherwise Scrolls." By Prof. CAYLEY. Received May 30, 1868.

(Abstract.)

The present Memoir is supplementary to my "Second Memoir on Skew Surfaces, otherwise Scrolls," Phil. Trans. vol. cliv. (1864) pp. 559-577, and relates also to the theory of skew surfaces of the fourth order, or quartic scrolls. It was pointed out to me by Herr Schwarz, in a letter dated Halle, June 1, 1867, that in the enumeration contained in my Second Memoir I have given only a particular case of the quartic scrolls, which have a directrix skew cubic; viz. my eighth species,  $S(1, 3^2)$ , where there is also a directrix line. And this led me to observe that I had in like manner mentioned only a particular case of the quartic scrolls with a triple directrix line; viz. my third species,  $S(1_3, 1, 4)$ , where there is also a simple directrix line. The omitted species, say, *ninth species*,  $S(1_3)$ , with a triple directrix line, and tenth species,  $S(3^2)$ , with a directrix skew cubic, are considered in the present Memoir; and in reference to them I develop a theory of the reciprocal relations of these scrolls, which has some very interesting analytical features.

The paragraphs of the present Memoir are numbered consecutively with those of my Second Memoir above referred to.